

Station A (Questions 1-15)

Microscopes

Directions: Identify the parts of a stereomicroscope.

#1-8 are labeled on the microscope itself.

Directions: Answer the questions below about this microscope.

#9-11. List three parts on this stereomicroscope that are also found on a compound microscope.

#12-14. List three MAJOR differences on this stereomicroscope compared to a compound microscope.

#15. What is a stereomicroscope used for?

#16. What is the magnification on this stereomicroscope?

Station B (Questions 16-27)

Identifying Variables

For each of the following statements or descriptions identify the independent variable (IV) and dependent variable (DV).

Elizabeth wanted to test if temperature affected how fast milk goes bad and curdles. She left milk in a room temperature closet, a fridge, and an oven that was turned on low heat. She then measured how rotten the milk was after 10 days.

17. Independent Variable:

18. Dependent Variable:

Students of different ages were given the same jigsaw puzzle to put together. They were timed to see how long it took to finish the puzzle.

19. Independent Variable:

20. Dependent Variable:

An investigation was done with an electromagnetic system made from a battery and wire wrapped around a nail. Different sizes of nails were used. The number of paper clips the electromagnet could pick up was measured.

21. Independent Variable:

22. Dependent Variable:

The higher the temperature of water, the faster an egg will boil.

23. Independent Variable:

24. Dependent Variable:

A study was done with white rats to see if the number of offspring born was affected by the number of minutes of exposure to X-rays by the mother rats.

25. Independent Variable:

26. Dependent Variable:

The temperature of water was measured at different depths of a pond.

27. Independent Variable:

28. Dependent Variable:

Station C (Questions 25-34)

Genetics

Directions: Select the best answer choice for each multiple choice question.

29. Humans have _____ chromosomes.
- 23
 - 46
 - 92
 - 112
30. A section of chromosomes that codes for a trait can be called a(n):
- nucleotide
 - base-pair
 - gene
 - nucleus
31. Sex cells of a human have _____ chromosomes and are called _____.
- 10, haploid
 - 92, diploid
 - 23, haploid
 - 46, diploid
32. A person born with an extra chromosome could have:
- Heightened intelligence
 - Down's Syndrome
 - Red eyes
 - Polygenic traits
33. Each chromosome is made of two identical:
- genes
 - nuclei
 - chromatids
 - bases
34. If a person receive an X and a Y chromosome, that person is:
- female
 - male
 - red haired
 - mentally challenged
35. Two alleles for pea plant height are designated T (tall) and t (dwarf). These alleles are found on:
- genes
 - sex chromosomes
 - ribosomes
 - homologous chromosomes
36. An animal has 40 chromosomes in its gametes, how many chromosomes would you expect to find in its brain cells?
- 1
 - 20
 - 40
 - 80
37. A picture of a person's chromosomes is called a
- karyotype
 - syndrome
 - chromatin
 - fingerprint

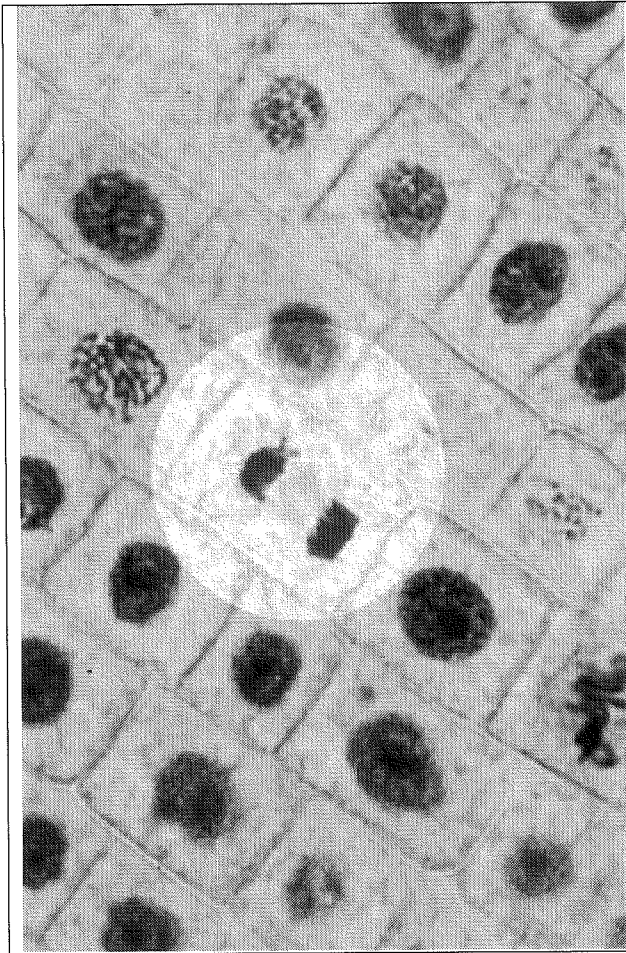
Station D (Questions 36-38)

Onion Root Mitosis

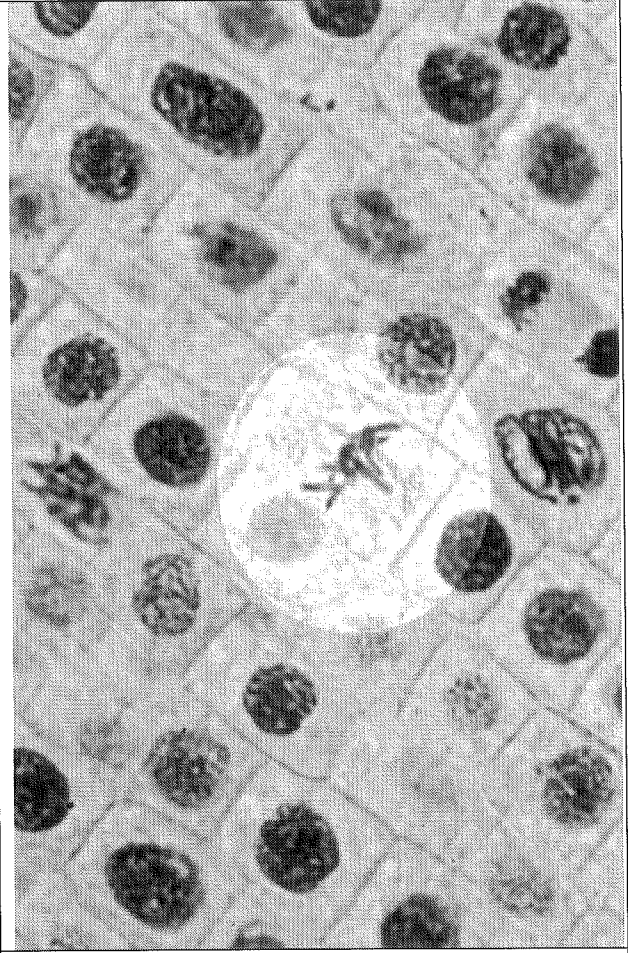
It is common to see photomicrographs of onion root cells when demonstrating how cell division takes place in plants. Onions have larger chromosomes than most plants and stain dark. The chromosomes are easily observed through a compound light microscope.

Directions: Look at the allium root tip slide with the compound microscope provided and answer the questions below.

- 38.** The pointer inside the eyepiece is pointing at a cell with two nuclei. Which phase of mitosis is this cell in?
 - a. Anaphase
 - b. Interphase
 - c. Metaphase
 - d. Telophase
- 39.** About six cells above the previous cell, you will see another cell that appears to have dark pink lines within the cell. Those lines are:
 - a. cell membranes
 - b. chloroplasts
 - c. chromosomes
 - d. cytoplasm
- 40.** The dark pink lines mentioned above are being pulled apart by temporary structures created by the centriole called:
 - a. chromatids
 - b. mitochondria
 - c. nuclei
 - d. spindle fibers
- 41.** The cell mentioned above is most likely in which phase?
 - a. Interphase
 - b. Metaphase
 - c. Prophase
 - d. Telophase



Cell #1



Cell #2

Station E (Questions 39-46)

Identify the lab tools on the table.

- 42. A is a(n) _____
- 43. B is a(n) _____
- 44. C is a(n) _____
- 45. D is a(n) _____
- 46. E is a(n) _____
- 47. F is a(n) _____
- 48. G is a(n) _____
- 49. H is a(n) _____
- 50. I is a(n) _____
- 51. J is a(n) _____
- 52. K is a(n) _____
- 53. L is a(n) _____
- 54. M is a(n) _____
- 55. N is a(n) _____
- 56. O is a(n) _____
- 57. P is a(n) _____

Station F (Questions 47-49)

Measurement

Directions: Use the Vernier calipers to determine the dimensions of the plastic straw to the nearest hundredth of a centimeter.

58. The exterior diameter of the straw is _____.

59. The interior diameter of the straw is _____.

60. The thickness of the straw is _____.

Station G (Questions 50-54)

Measurement

Directions: Use the triple beam balance to find the mass of the following objects:

- 61. The mass of the cork is _____.
- 62. The mass of the binder clip is _____.
- 63. The mass of the pink paper clip is _____.
- 64. The mass of the Sharpie is _____.
- 65. The mass of the masking tape is _____.
- 66. The mass of the screw is _____.
- 67. The mass of the bucket is _____.
- 68. The mass of the screwdriver is _____.
- 69. The mass of the socket is _____.

Use your answers from above to solve these math problems:

- 70. Binder clip – paper clip = _____.
- 71. Screwdriver x Sharpie = _____.
- 72. Bucket + pink paper clip ÷ cork = _____.
- 73. Socket² = _____.
- 74. Cork(screw + masking tape) = _____.
- 75. Screw + screwdriver – masking tape = _____.
- 76. Sharpie ÷ pink paper clip = _____.
- 77. √socket = _____.

Station H (Questions 55-59)

Nutrition & Energy

Examine the food label on the food provided.

American Cheese

Nutrition Facts		
Serving Size 2 Slices		
Servings Per Container 16		
Amount Per Serving		
Calories	210	Calories from Fat 150
%Daily Value*		
Total Fat	17g	26 %
Saturated Fat	11g	54 %
Cholesterol	50mg	17 %
Sodium	790mg	33 %
Total Carbohydrate	1g	0 %
Dietary Fiber	0g	0 %
Sugars	1g	
Protein	12g	
Vitamin A	15%	Vitamin C 0%
Calcium	35%	Iron 0%
* Percent Daily Values are based on a 2,000 calorie diet.		

78. What is the serving size of American Cheese?

79. How many calories would you get if you ate four slices of American Cheese?

80. Would American Cheese be a good choice of dietary fiber?

81. Which nutrients found in American Cheese would be considered HIGH and therefore not a healthy choice?

82. Which nutrient in American Cheese would be considered HIGH and therefore would be a healthy choice?

83. True or False: Eating American Cheese is a totally unhealthy choice.

84. True or False: You can eat American Cheese, but not too much or too often.

Station I (Questions 60-62)

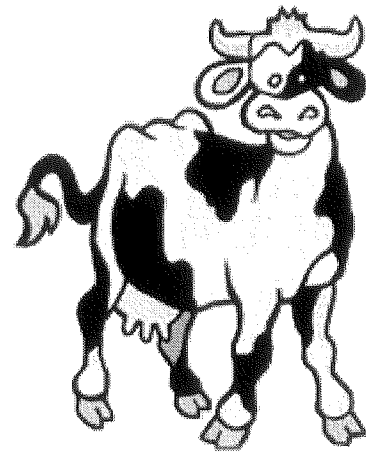
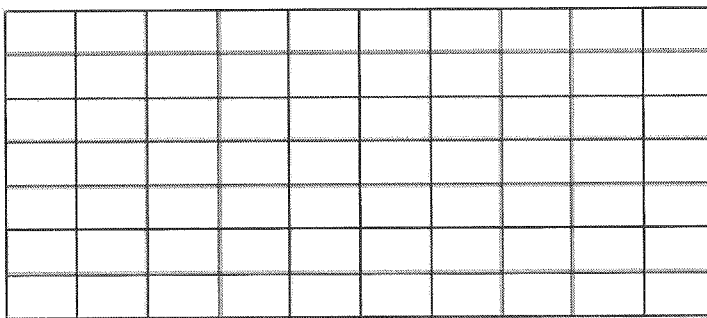
Graphs & Data Tables

Follow the directions for each of the following. Make sure the answers are on your answer sheet.

A type of feed claims to boost the growth rate of cows. The feed is tested on two twin newborn cows. Bessie receives the experimental feed, and Bertha receives regular corn feed. Their weights are recorded below.

Month	April	May	June	July	Aug
Bessie	150 lbs	210 lbs	260 lbs	320 lbs	400 lbs
Bertha	150 lbs	250 lbs	290 lbs	340 lbs	400 lbs

85. Graph the data; use a dotted line for Bessie and a straight line for Bertha. Make sure you label the X and Y axis.



86. Both cows ended at the same weight, but did the experimental feed change the way they gained weight at all? Describe your conclusions about the experimental feed and explain why it is important that the experiment used twin cows?

Station J (Questions 62-64)

Materials:

- Dixie cup
- Alka-Seltzer tablet
- water
- electronic scale

Procedure:

Make sure the electronic scale reads "0.0" before you begin!

87. Place a small piece of Alka-Seltzer onto the scale and record the mass onto your answer sheet.

Place an empty Dixie cup on the scale and press the TARE button to zero out the scale.

88. Fill the Dixie cup halfway with water and record the mass of the water onto your answer sheet.

89. Add the Alka-Seltzer tablet into the cup of water and record the mass onto your answer sheet.

90. Notice what happens to the mass as the reaction occurs. Explain why this happens on your answer sheet.

Make sure the electronic scale reads "0.0" before you leave this station!

Station K

Directions: Complete the following Punnett Squares. Be sure that you include the ratios of the genotypes (and the words used to describe those alleles) and phenotypes of the characteristics.

91. B= Brown eyes b= blue eyes Mom= Bb Dad= BB What are the eye color possibilities if they chose to have children?

Genotypes

Phenotypes

92. Curly hair is recessive, and straight hair is dominant. A woman with curly hair marries a man who is homozygous dominant for straight hair. Predict the outcomes for their children.

Genotypes

Phenotypes

93. Black hair is homozygous dominant. Brown hair is heterozygous. Blonde hair is homozygous recessive. (This is an example of incomplete dominance.) A woman with brown hair marries a man with brown hair. What are the possible outcomes for their kids?

Genotypes

Phenotypes

94. Attached earlobes are dominant over free hanging earlobes. Complete the Punnett Square for the following individuals: Mom=BB and Dad=bb

Genotypes

Phenotypes

95. Incomplete dominance problem: T=tall (5'11"-6'2"); Tt=medium height (5'4"-5'10") t=short (5'3" or smaller)

Mom= 5'5"

Dad= 6'0"

What are the possible height outcomes of their children?

Genotypes

Phenotypes

96. Freckles are recessive. No freckles are dominant.

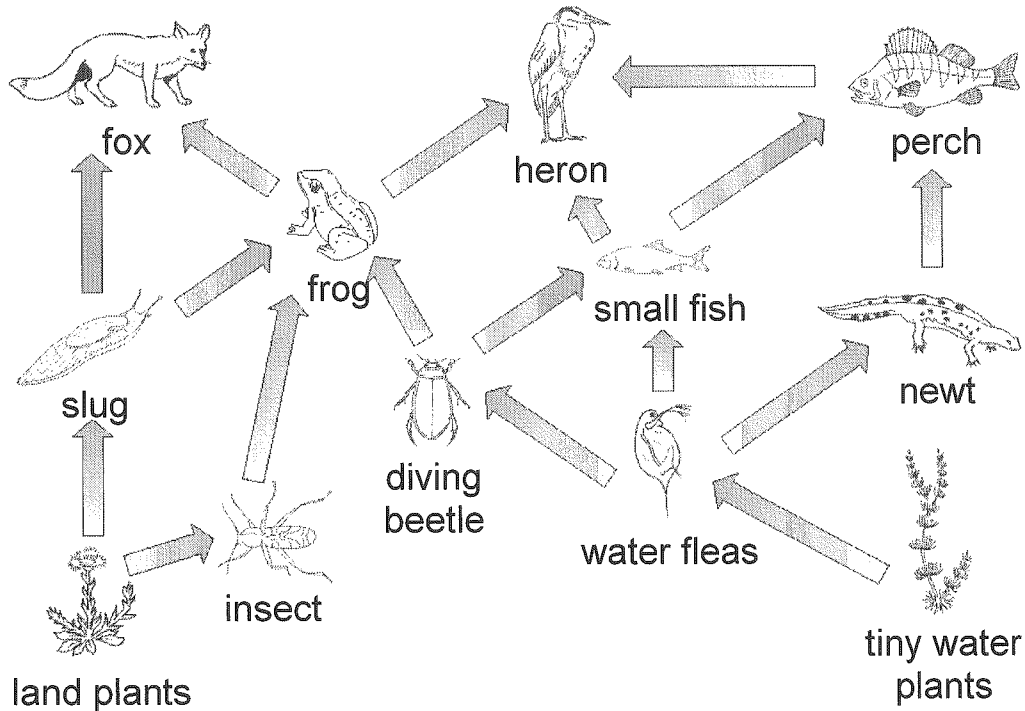
Mom= heterozygous Dad=homozygous recessive Possible outcomes for kids?

Genotypes

Phenotypes

Station L

Directions: Look at this food web. Then answer the questions.



97. Name two producers in the food web.
98. Name three consumers in the food web.
99. Write a food chain from this food web with six trophic levels.
100. Name the animals that the small fish eats.
101. Name the animals that eat the small fish.
102. Explain what could happen to the community if all the frogs suddenly died.
103. How are food webs different from food chains? Explain why food webs are more useful.

Station M

Directions: Use the dichotomous key to identify the species of insect on the table.

#104.